Illinois River Watershed & Lake Tenkiller Update

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US EPA Region 6

Overview

- Watershed model adjustments
- Source Allocations
- Lake Tenkiller revised output

Illinois River Watershed

Updates

- Temporal litter shift necessary due to date usage in UCI file
  - RMSEs were maintained
- EFDC output generated
- Calibration and Base Runs are static
  - Dependent on public comment
- Annual loadings provide a simple start for scenario discussion

Temporal Litter Shift

- Litter was shifted due to March being the start month

```
*** Action Line (currently set for 1.00 tons/ac and no deferral)
  <oper><f><-l> *** <yr><m><d><h><n>dstp  <vari><1><2><3><a><-value--> tc tst nu
*** 2001
  PERLND 32    DY  12001  3  1 12    1 3  LITTER          +=      0.59
  PERLND 52    DY  12001  3  1 12    1 3  LITTER          +=      1.12
  PERLND 72    DY  12001  3  1 12    1 3  LITTER          +=      0.92
  PERLND 92    DY  12001  3  1 12    1 3  LITTER          +=      0.38
  PERLND112    DY  12001  3  1 12    1 3  LITTER          +=      0.64
  PERLND132    DY  12001  3  1 12    1 3  LITTER          +=      0.73
  PERLND152    DY  12001  3  1 12    1 3  LITTER          +=      1.35
  PERLND172    DY  12001  3  1 12    1 3  LITTER          +=      1.52
  PERLND192    DY  12001  3  1 12    1 3  LITTER          +=      0.67
  PERLND212    DY  12001  3  1 12    1 3  LITTER          +=      0.87
  PERLND232    DY  12001  3  1 12    1 3  LITTER          +=      0.45
  PERLND252    DY  12001  3  1 12    1 3  LITTER          +=      0.32
  PERLND272    DY  12001  3  1 12    1 3  LITTER          +=      0.26
  PERLND292    DY  12001  3  1 12    1 3  LITTER          +=      0.25
  PERLND312    DY  12001  3  1 12    1 3  LITTER          +=      0.07
  PERLND332    DY  12001  3  1 12    1 3  LITTER          +=      0.35
```

```
*** EDIT by TAS on 10/12/2016 - (Already made this change in the EFDC distribution) Shifted dates to Match
*** kwd  ds  ct tc  ts  def     f1   f2   f3   f4   f5   f6   f7   f8   f9  f10
  <****>< > < > <> < > <--->  <--><--><--><--><--><--><--><--><--><--><--->
  DISTRB  1   6 MO   2 SHIFT    .40  .16  .10  .17  .09  .08
```

HSPF Output to EFDC

- Open file here

Source Allocations

What was requested…

- Discussion specific to Arkansas
  - Point source 0 discharge / 0 concentration TP
  - Point source at limit and design flow
  - Point sources at headspace [x]
  - Litter loading at 0 in AR only @ 630. (Leave OK litter application)
  - Revert all pasture to forest land (both state)

What was requested…continued

- Discussion specific to Oklahoma
  - Point sources at 0 discharge
  - All of AR questions
  - Feed & Litter?
  - Litter Application – Litter from April – June

Where the rubber meets the road!

- Annual averaged % source allocations
- Discussion starting point
- A few *provisos*

Baseline Annual % Allocation Table

Reach	P:Forest	P:Pasture1	P:Pasture2	P:Pasture3	P:Grass/Shrub/Barren	P:Developed, Open	P:Developed, Low	P:Developed, Med/High	P:Wetlands	P:Cropland	P:Pasture1-Litter	I:Developed, Open	I:Developed, Low	I:Developed, Med/High	PointSources	Direct Atmospheric Deposition on the Reach	Mass Balance Differences/Additional Sources*	Diversion	Cumulative Instream Losses	Cumulative Instream Gains	Total**
RCHRES 630 - Illinois River	2.71	20.12	10.56	31.68	0.99	3.49	3.46	2.01	0.03	0.2	12.11	0.08	0.08	1.38	6.2	0	0.01	0	-0.86	4.89	100
RCHRES 870 - Illinois River	3.76	21.9	9.98	26.93	2.44	2.95	2.41	1.42	0.04	0.2	12.44	0.07	0.06	0.98	5.02	0	0.01	0	-1.33	9.39	100

Calibration Annual % Allocation Table (For Comparison Only)

Reach	P:Forest	P:Pasture1	P:Pasture2	P:Pasture3	P:Grass/Shrub/Barren	P:Developed, Open	P:Developed, Low	P:Developed, Med/High	P:Wetlands	P:Cropland	P:Pasture1-Litter	I:Developed, Open	I:Developed, Low	I:Developed, Med/High	PointSources	Direct Atmospheric Deposition on the Reach	Mass Balance Differences/Additional Sources*	Diversion	Cumulative Instream Losses	Cumulative Instream Gains	Total**
RCHRES 630 - Illinois River	2.32	13.84	7.3	21.18	0.91	3.28	2.43	1.16	0.02	0.21	11.86	0.08	0.49	0.88	30.16	0	0.01	0	-1.13	3.86	100
RCHRES 870 - Illinois River	3.46	16.25	7.3	18.95	2.31	2.84	1.75	0.83	0.04	0.21	12.76	0.07	0.36	0.64	25.19	0	0.01	-0.51	-1.99	7.55	100

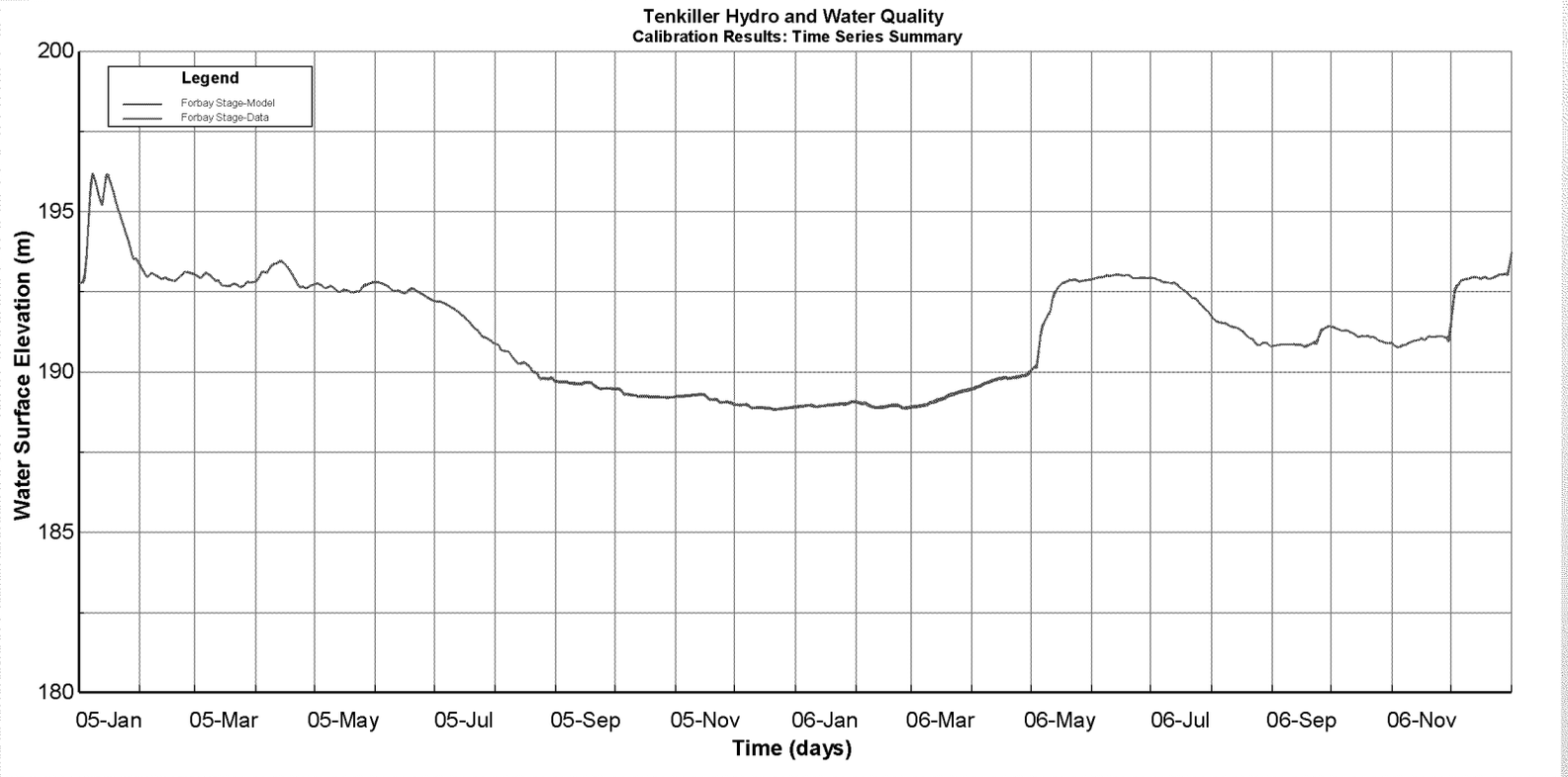
Lake Tenkiller Output

Current Calibration Status as of October 11, 2016

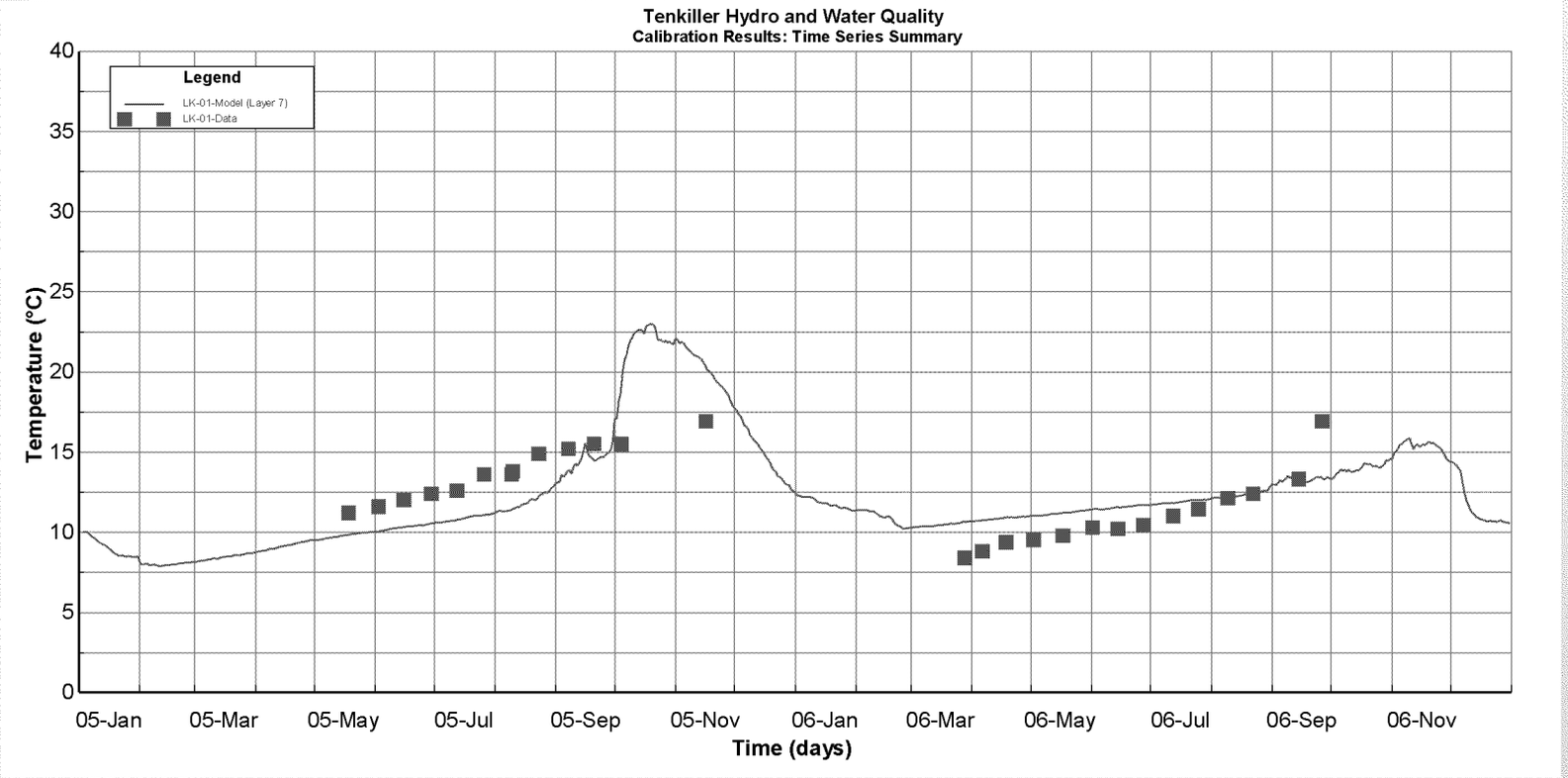
- Flow calibrated
- Temperature calibrated
- TSS partially calibrated

- DO partially calibrated
- Nutrients not calibrated
- Chlorophyll-a not calibrated
- Organic carbon species partially calibrated

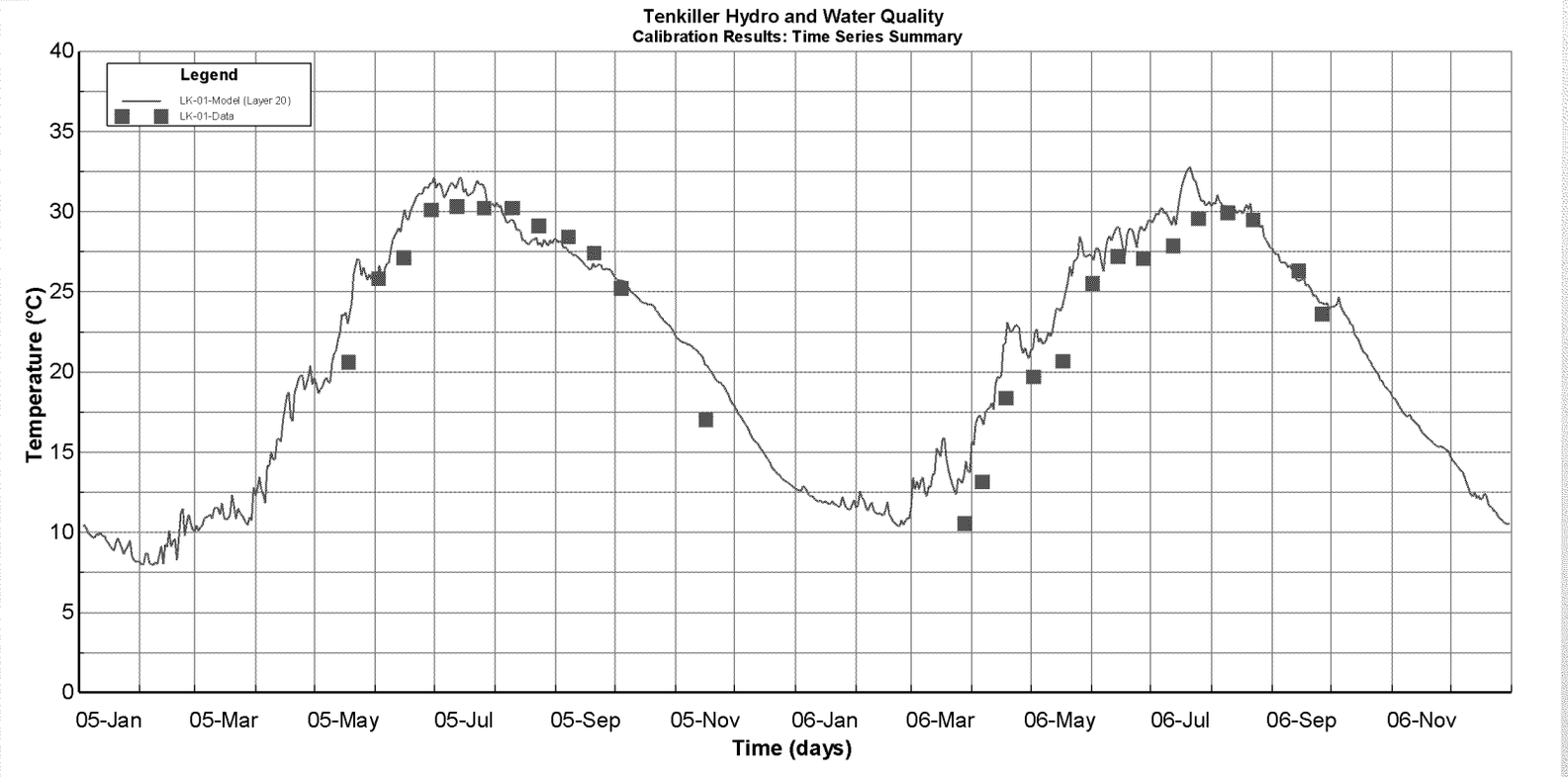
Flow Calibration



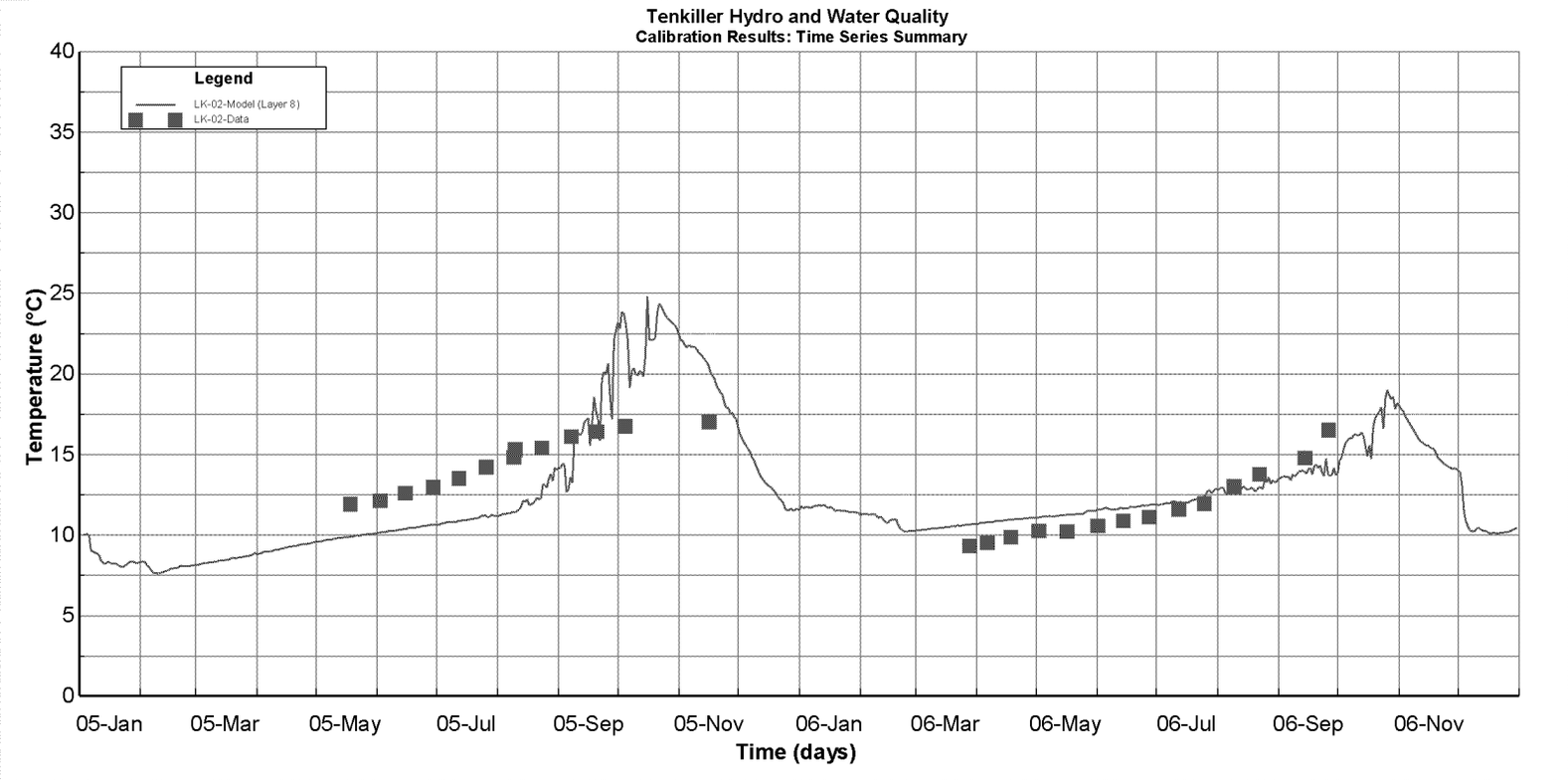
Temperature @ LK01 Layer 7



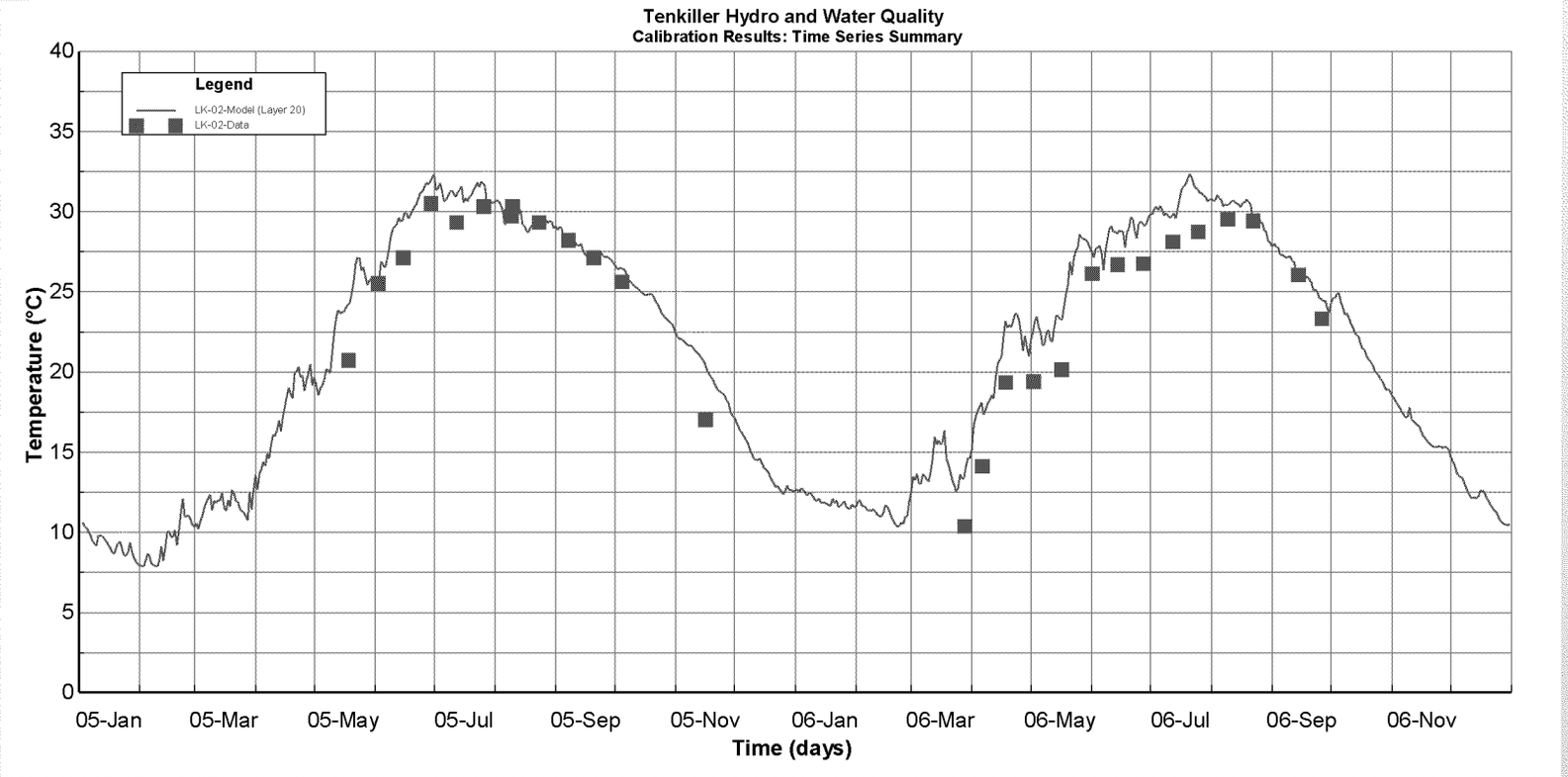
Temperature @ LK01 Layer 20



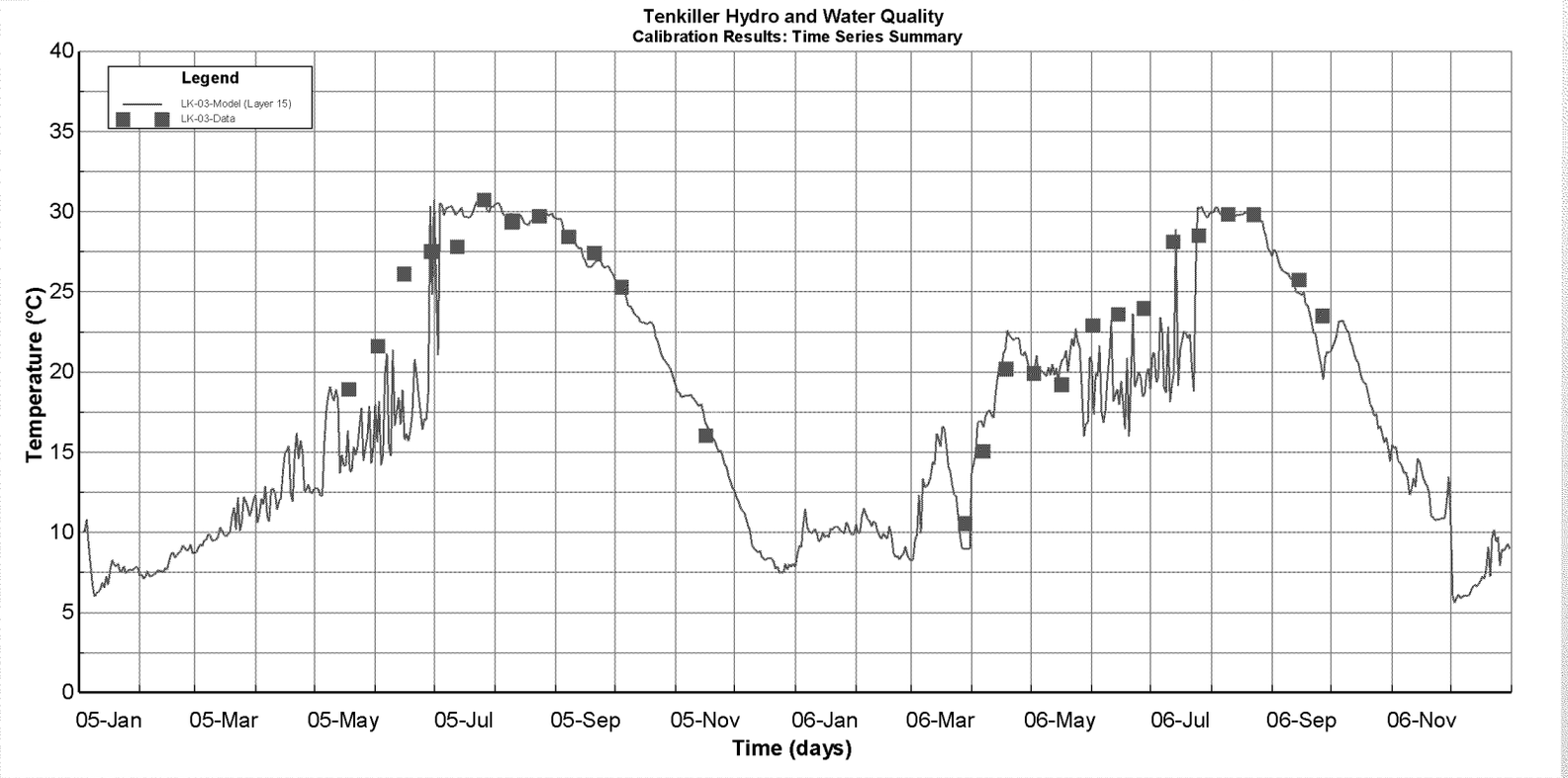
Temperature @LK02 Layer 8



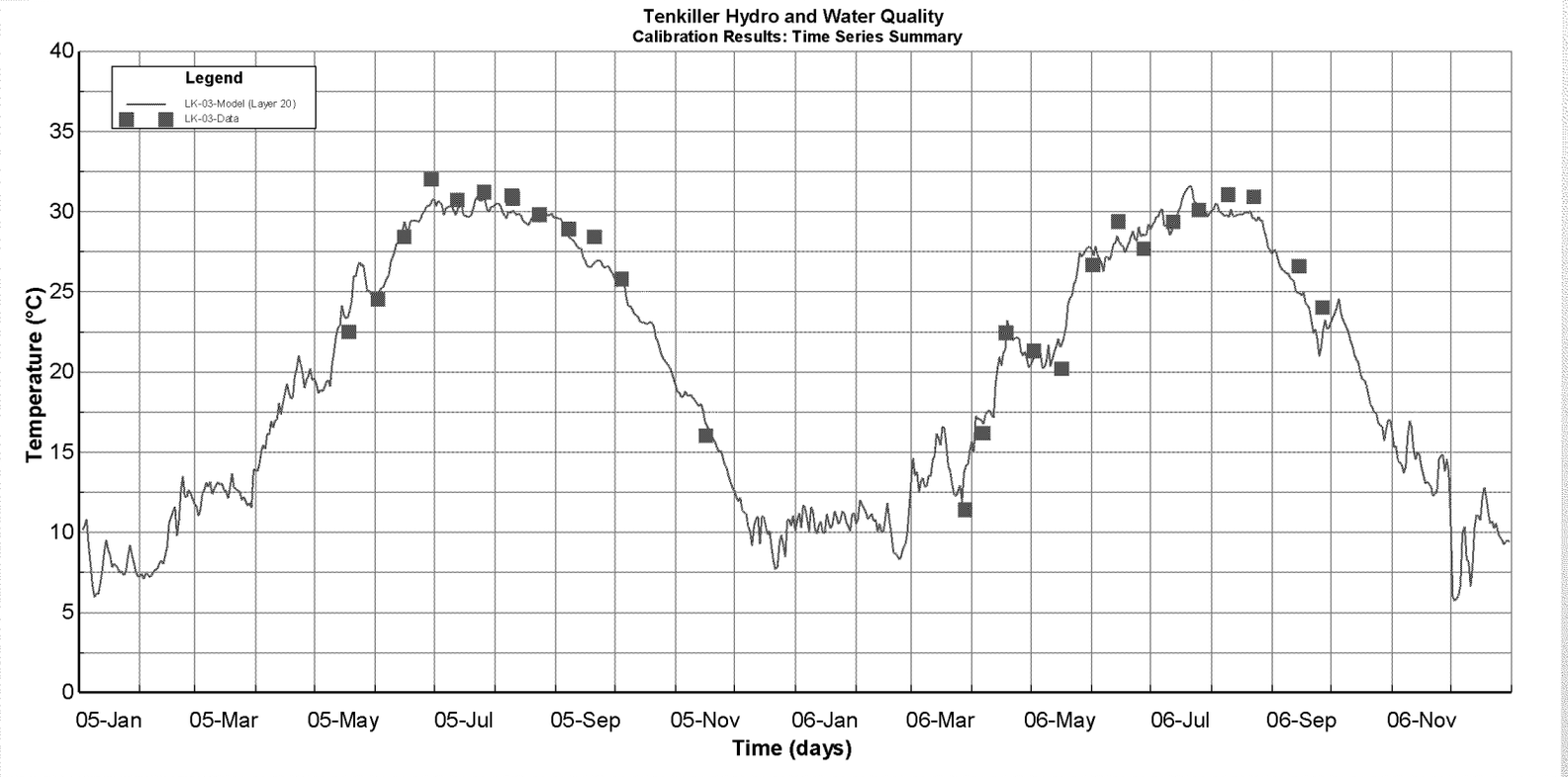
Temperature @ LK02 Layer 20



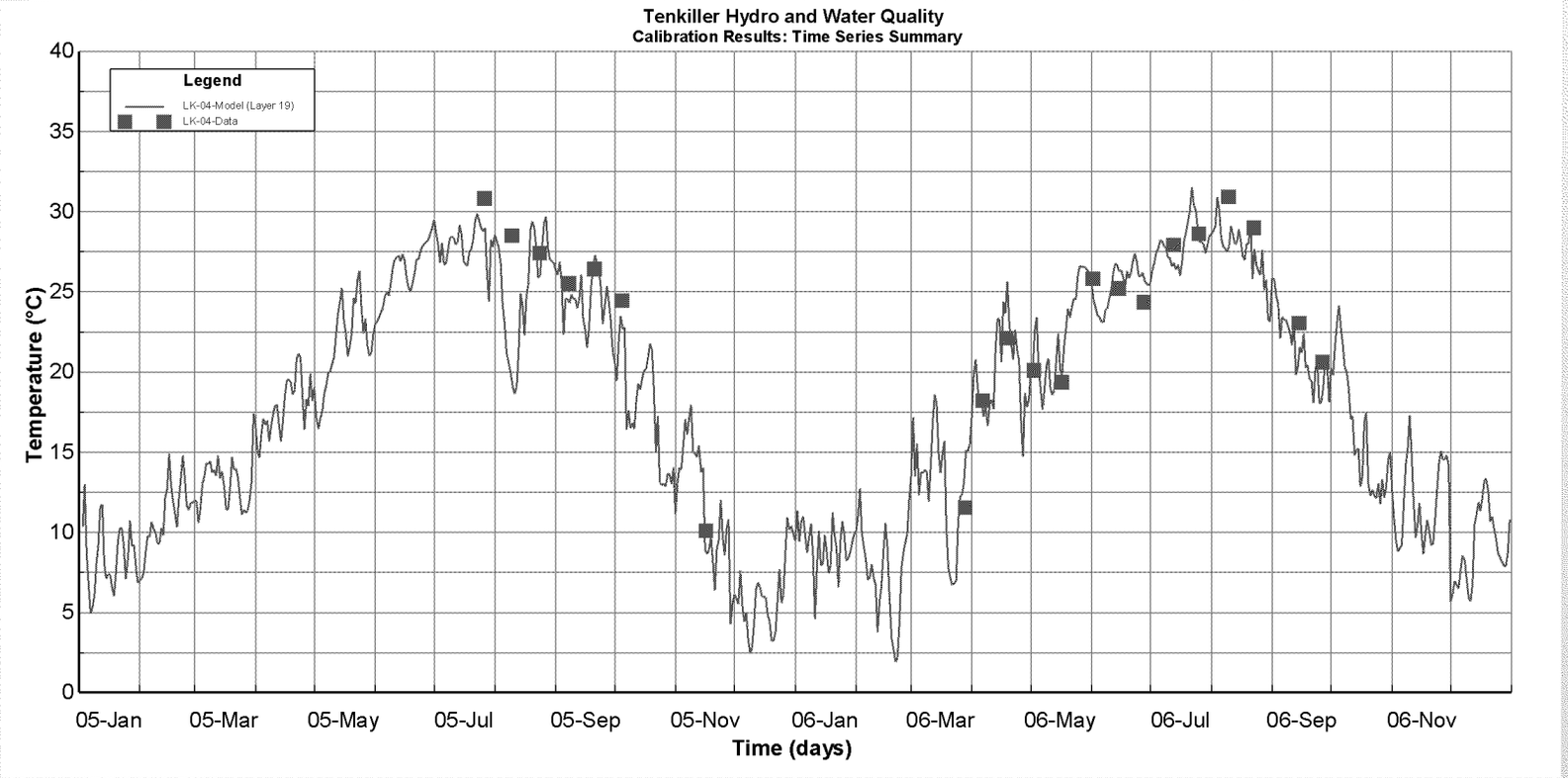
Temperature @ LK03 Layer 15



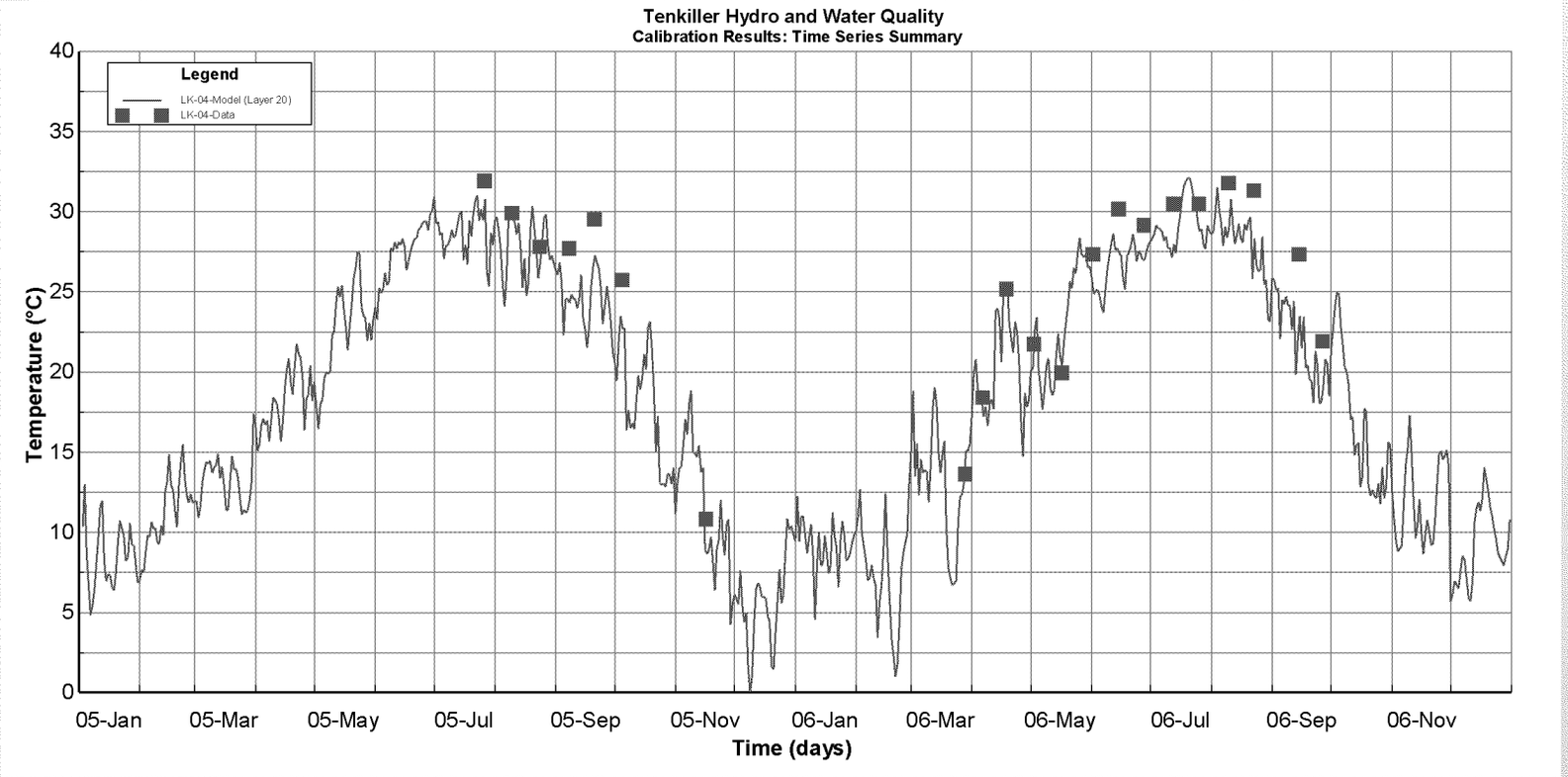
Temperature @LK03 Layer 20



Temperature @ LK04 Layer 19



Temperature @LK04 Layer 20



Lake Tenkiller

- Calibration continues
- Interdependent calibration parameters
  - Calibration of P species and N species
  - Dissolved oxygen
  - TSS light scatter
  - Carbon
- Much closer but not quite there!